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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/722,929

11/26/2003

Joseph P. Rynd

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7590

06/12/2008

OWENS CORNING
2790 COLUMBUS ROAD
GRANVILLE, OH 43023

EXAMINER

WOLLSCHLAGER, JEFFREY MICHAEL

ART UNIT

PAPER NUMBER

1791

MAIL DATE

DELIVERY MODE

06/12/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/722,929	Applicant(s) RYND ET AL.	
	Examiner JEFFREY WOLLSCHLAGER	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-15 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-15 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 28, 2008 has been entered.

Response to Amendment

Applicant's amendment to the claims filed April 28, 2008 has been entered. Claims 1-8, 10-15 and 21 are currently amended. Claims 9, 16-20 and 22-26 have been canceled. Claims 1-8, 10-15 and 21 are pending and under examination. Applicant's amendment to the claims has overcome the claim objections and the 35 USC 112 first paragraph rejection of claims 21 and 23.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-8 and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grinshpun et al. (WO 2001/39954) in view of Nelson et al. (US 2005/0027040).

Regarding claim 1, Grinshpun et al. teach a method of manufacturing a rigid foam (Figure 6; page 10, lines 5-30) comprising: incorporating fillers and reinforcing materials such as graphite, conductive carbon black, calcium carbonate, and nanofillers into a polymer (page 17 lines 12-20) and at least one nucleating agent (page 19, line 38 – page 20, line 5), including conventional nucleating agents such as calcium carbonate, incorporating a blowing agent into the melt under a first pressure and a first temperature (page 20, lines 7-30), extruding the polymer melt under a second pressure and temperature to allow the polymer melt to expand and foam, and cooling the foamed product (page 21, lines 9-30) to produce a foam consisting primarily of blends of polystyrene (page 14, line 41-page 15 line 42; page 24), with a cell size ranging from 25 to 7000 micrometers (page 23, lines 11-15). Grinshpun et al. do not explicitly teach that the calcium carbonate employed as a nucleating agent or as a filler/reinforcing material has a particle size in at least one dimension of less than 100 angstroms.

However, Nelson et al. disclose a method wherein inorganic additives such as nanoparticles of calcium carbonate are combined with resin to form nanocomposite additives for extrusion processes, wherein the calcium carbonate employed to form the nanocomposite has a particle size as low as about 2 nm (20 angstroms) (see paragraphs [0038-0043] specifically and the Abstract and paragraphs [0004, 0008, 0012, 0019, 0020, 0051, 0052, 0056, 0079] for context).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have modified the method of Grinshpun and to have employed the calcium carbonate nanocomposites disclosed Nelson et al., for the purpose, as suggested by Nelson et al., of improving the blendability of the additives and improving the mechanical and thermal properties of the article to be produced.

As to claims 2-4, Grinshpun teaches blends primarily comprising polystyrene (page 14, line 41-page 15 line 42; page 24).

As to claims 5 and 6, Grinshpun teaches various blowing agents may be employed (page 18, lines 6-30).

As to claims 7 and 8, Grinshpun teaches incorporating additives into the polymer melt such as nucleation agents, fillers and pigments (page 17, lines 12-20; page 19, line 38 - page 20, line 30).

As to claims 10-13, Grinshpun discloses employment of polystyrene as the resin and Nelson discloses and suggests intercalating the additive in polystyrene/the resin that the additive is ultimately to be extruded with (paragraphs [0015, 0019, 0020, and 0040-0043]). Grinshpun discloses the nucleating agent can be added within a range of 0.01 to 5 parts by weight per hundred parts by weight of resin (page 19, line 38-page 20 line 5).

As to claims 14 and 15, Grinshpun teaches the foam has a density of 8 to 640 kg/m³ (page 13, lines 4-22; page 24, lines 25-37) and that the cell size is between 25 and 7000 micrometers (page 23, lines 11-15). Grinshpun is silent as to the other cell structure parameters. However, the combination employs the same claimed materials and the same claimed process. Accordingly, the same claimed physical properties and effects would intrinsically be achieved by the practice of the combined method.

Claims 1-8, 10-12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grinshpun et al. (WO 2001/39954) in view of Morgenstern (US 6,589,646).

Regarding claim 1, Grinshpun et al. teach a method of manufacturing a rigid foam (Figure 6; page 10, lines 5-30) comprising: incorporating fillers and reinforcing materials such as graphite, conductive carbon black, calcium carbonate, and nanofillers into a polymer (page 17 lines 12-20) and at least one nucleating agent (page 19, line 38 – page 20, line 5), including conventional nucleating agents such as calcium carbonate, incorporating a blowing agent into the melt under a first pressure and a first temperature (page 20, lines 7-30), extruding the polymer melt under a second pressure and temperature to allow the polymer melt to expand and foam, and cooling the foamed product (page 21, lines 9-30) to produce a foam consisting primarily of blends of polystyrene (page 14, line 41-page 15 line 4; page 24), with a cell size ranging from 25 to 7000 micrometers (page 23, lines 11-15). Grinshpun et al. do not explicitly teach that the calcium carbonate employed as a nucleating agent or as a filler/reinforcing material has a particle size in at least one dimension of less than 100 angstroms.

However, Morgenstern discloses that calcium carbonate having a particle size as low as 0.005 um (50 angstroms) may be employed as a nucleating agent in foam applications (Abstract; col. 2, lines 58-67).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have modified the method of Grinshpun and to have employed the calcium carbonate disclosed by Morgenstern for the purpose of employing an art recognized suitable and conventional nucleating agent to produce a foam product (MPEP 2144.06-2144.07).

As to claims 2-4, Grinshpun teaches blends primarily comprising polystyrene (page 14, line 41-page 15 line 42; page 24).

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As to claims 5 and 6, Grinshpun teaches various blowing agents may be employed (page 18, lines 6-30).

As to claims 7 and 8, Grinshpun teaches incorporating additives into the polymer melt such as nucleation agents, fillers and pigments (page 17, lines 12-20; page 19, line 38 - page 20, line 30).

As to claims 10-12, Grinshpun discloses polystyrene and that the nucleating agent can be added within a range of 0.01 to 5 parts by weight per hundred parts by weight of resin (page 19, line 38 – page 20, line 5). Morgenstern discloses employment of from 0.1 to 10% by weight of the nucleating agent (col. 3, lines 1-4).

As to claims 14 and 15, Grinshpun teaches the foam has a density of 8 to 640 kg/m³ (page 13, lines 4-22; page 24, lines 25-37) and that the cell size is between 25 and 7000 micrometers (page 23, lines 11-15). Grinshpun is silent as to the other cell structure parameters. However, the combination employs the same claimed materials and the same claimed process. Accordingly, the same claimed physical properties and effects would intrinsically be achieved by the practice of the combined method.

Claims 1-8 and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (WO 01/40362) in view of Nelson et al. (US 2005/0027040).

Regarding claim 1, Miller et al. teach the basic claimed process of producing an extruded rigid foam to yield an insulating panel (page 10, lines 21-24) wherein a blowing agent is incorporated into the polymer melt at a first pressure and temperature (page 6, line 5-31); extruding the polymer melt under a second pressure and temperature to form a foam and intrinsically cooling the foam to form a product with a cell size within the claimed range (page 2, line 19-page 3, line 24; page 9, line 13-page 10, line 25). The preferred polymer melt includes

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an alkenyl aromatic polymer material, such as polystyrene (page 3, line 25- page 4, line 28).

Miller et al. further teach that optional additives, including fillers, may be included to obtain desired foam characteristics (page 5, lines 8-15), but do not disclose incorporating nanoparticles as claimed.

However, Nelson et al. disclose a method wherein inorganic additives/fillers such as nanoparticles of calcium carbonate are combined with resin to form nanocomposite additives/fillers for extrusion processes, wherein the calcium carbonate employed to form the composite has a particle size as low as about 2 nm (20 angstroms) (see paragraphs [0038-0043] specifically and the Abstract and paragraphs [0004, 0008, 0012, 0019, 0020, 0051, 0052, 0056, 0079] for context).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have modified the method of Miller et al. and to have employed the calcium carbonate nanocomposites disclosed Nelson et al., for the purpose, as suggested by Nelson et al., of improving the blendability of the additives/fillers and improving the mechanical and thermal properties of the article to be produced.

As to claims 2-4, Miller et al. preferably employ polystyrene at greater than 95% and blending with a non-alkenyl aromatic polymer (page 3, line 25- page 4, line 23).

As to claim 5 and 6, Miller et al. disclose carbon dioxide as well as various other blowing agents (page 6, line 5- page 7, line 18).

As to claims 7 and 8, Miller et al. disclose adding the additives to the resin/foamable gel (page 5, lines 8-15) and include plasticizers and flame-retardants.

As to claims 10-13, Miller employ polystyrene as the resin and Nelson discloses and suggests intercalating the additive in polystyrene/the resin that the additive is ultimately to be extruded with (paragraphs [0015, 0019, 0020, and 0040-0043]). Nelson discloses the additive

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can be employed in a range of 0.1% to about 50% of the nanocomposite (paragraph [0050]). The examiner submits one having ordinary skill would have readily determined the amount of filler to employ in order to achieve the desired foam properties (e.g. Nelson paragraphs [0072, 0078, and 0079]; Miller (page 5, lines 8-15)).

As to claims 14 and 15, Miller et al. recite some of the physical properties of the foam (page 9, lines 13- page 10, line 27). Further, the combination teaches the same claimed process with the same claimed materials. As such, it follows that the combined method produces a product with the same claimed physical properties and effects.

Claims 1-8, 10-12, 14, 15 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (WO 01/40362) in view of Chen et al. (WO 2003/055804) and Tan (US 7,160,929).

Note: Citations to Chen et al. are from the US equivalent document US 2004/0234443.

Regarding claims 1 and 21, Miller et al. teach the basic claimed process of producing an extruded rigid foam to produce an insulating panel (page 10, lines 21-24) wherein a blowing agent is incorporated into the polymer melt at a first pressure and temperature (page 6, line 5-31); extruding the polymer melt under a second pressure and temperature to form a foam and intrinsically cooling the foam to form a product with a cell size within the claimed range (page 2, line 19-page 3, line 24; page 9, line 13-page 10, line 25). The preferred polymer melt includes an alkenyl aromatic polymer material, such as polystyrene (page 3, line 25- page 4, line 28). Miller et al. teach the cell orientation is greater than 0.95 (claim 12). Miller et al. further teach that optional additives, including fillers, may be included to obtain desired foam characteristics (page 5, lines 8-15) and employ talc and titanium dioxide as nucleating agents (page 4, line 30- page 5, line 5; page 1, line 28-34), but do not disclose utilizing calcium carbonate having a

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particle size in at least one dimension of less than 100 angstroms (claim 1) or acicular calcium carbonate (claim 21) with a particle size in at least one dimension of less than 100 angstroms. However, Chen et al. disclose employment of calcium carbonate needles having a particle size as low as 10 nm (100 angstroms) and fibers having a particle size as low as 1 nm that are suitable for strengthening the mechanical properties of plastics (Abstract; paragraphs [0003;0049]). Additionally, Tan discloses employment of nanofibers and nanopowders, such as calcium carbonate, in the production of nanocomposite foams (Abstract; col. 1, lines 18-64; col. 3, lines 1-21; col. 3, lines 64-67; col. 4, lines 63-col. 5, lines 17; col. 8, lines 25-34).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have employed calcium carbonate having a particle size of less than 100 angstroms in the method of Miller, including acicular calcium carbonate, as suggested by Chen et al. and Tan, for the purpose, as suggested by Tan of producing a lightweight material having superior mechanical properties (col. 3, lines 15-20). Further, regarding the exact particle size of the calcium carbonate needles of Chen et al., the examiner submits that at the upper end of the range "less than 100 angstroms" one skilled in the art would have expected the calcium carbonate needles to have had the same properties as at the lower end of the range disclosed by Chen et al. (i.e. 100 angstroms). See MPEP 2144.05 I.

As to claims 2-4, Miller et al. preferably employ polystyrene at greater than 95% and blending with a non-alkenyl aromatic polymer (page 3, line 25- page 4, line 23).

As to claim 5 and 6, Miller et al. disclose carbon dioxide as well as various other blowing agents (page 6, line 5- page 7, line 18).

As to claims 7 and 8, Miller et al. disclose adding the additives to the resin/foamable gel (page 5, lines 8-15) and include plasticizers and flame-retardants.

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As to claims 10-12, Miller et al. employ polystyrene as the resin. Further, the examiner submits one having ordinary skill would have readily determined the amount of filler to employ in order to achieve the desired foam properties (Miller page 5, lines 8-15; Chen paragraph [0003]).

As to claims 14 and 15, Miller et al. recite some of the physical properties of the foam (page 9, lines 13- page 10, line 27). Further, the combination teaches the same claimed process with the same claimed materials. As such, it follows that the method produces a product with the same claimed physical properties and effects.

Claims 1-8, 10-12, 14, 15 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grinshpun et al. (WO 2001/39954) in view of Chen et al. (WO 2003/055804) and Tan (US 7,160,929).

Note: Citations to Chen et al. are from the US equivalent document US 2004/0234443.

Regarding claims 1 and 21, Grinshpun et al. teach a method of manufacturing a rigid foam (Figure 6; page 10, lines 5-30) comprising: incorporating fillers and reinforcing materials such as graphite, conductive carbon black, calcium carbonate, and nanofillers into a polymer (page 17 lines 12-20) and at least one nucleating agent (page 19, line 38 – page 20, line 5), including conventional nucleating agents such as calcium carbonate, incorporating a blowing agent into the melt under a first pressure and a first temperature (page 20, lines 7-30), extruding the polymer melt under a second pressure and temperature to allow the polymer melt to expand and foam, and cooling the foamed product (page 21, lines 9-30) to produce a foam consisting primarily of blends of polystyrene (page 14, line 41-page 15 line 4; page 24), with a cell size ranging from 25 to 7000 micrometers (page 23, lines 11-15). Grinshpun do not disclose utilizing calcium carbonate having a particle size in at least one dimension of less than 100 angstroms

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(claim 1) or acicular calcium carbonate (claim 21) with a particle size in at least one dimension of less than 100 angstroms.

However, Chen et al. disclose employment of calcium carbonate needles having a particle size as low as 10 nm (100 angstroms) and fibers having a particle size as low as 1 nm (10 angstroms) that are suitable for strengthening the mechanical properties of plastic materials (Abstract; paragraphs [0003;0049]). Additionally, Tan discloses employment of nanofibers and nanopowders, such as calcium carbonate, in the production of nanocomposite foams (Abstract; col. 1, lines 18-64; col. 3, lines 1-21; col. 3, lines 64-67; col. 4, lines 63-col. 5, lines 17; col. 8, lines 25-34).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have employed calcium carbonate having a particle size of less than 100 angstroms in the method of Grinshpun, including acicular calcium carbonate, as suggested by Chen et al. and Tan, for the purpose, as suggested by Tan of producing a lightweight material having superior mechanical properties (col. 3, lines 15-20). Further, regarding the exact particle size of the calcium carbonate needles of Chen et al., the examiner submits that at the upper end of the range "less than 100 angstroms" one skilled in the art would have expected the calcium carbonate needles to have had the same properties as at the lower end of the range disclosed by Chen et al. (i.e. 100 angstroms). See MPEP 2144.05 I.

As to the claimed cell orientation of claim 21, the examiner submits the combination suggests employing the same claimed process steps and substantially the same claimed materials. As such, the examiner submits the same claimed effects and physical properties would be achieved by the practice of the combined method.

As to claims 2-4, Grinshpun teaches blends primarily comprising polystyrene (page 14, line 41-page 15 line 42; page 24).

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As to claims 5 and 6, Grinshpun teaches various blowing agents may be employed (page 18, lines 6-30).

As to claims 7 and 8, Grinshpun teaches incorporating additives into the polymer melt such as nucleation agents, fillers and pigments (page 17, lines 12-20; page 19, line 38 - page 20, line 30).

As to claims 10-12, Grinshpun employ polystyrene as the resin and disclose that the nucleating agent can be added within a range of 0.01 to 5 parts by weight (page 19, line 38- page 20 line 5).

As to claims 14 and 15, Grinshpun teaches the foam has a density of 8 to 640 kg/m³ (page 13, lines 4-22; page 24, lines 25-37) and that the cell size is between 25 and 7000 micrometers (page 23, lines 11-15). Grinshpun is silent as to the other cell structure parameters. However, the combination employs the same claimed materials and the same claimed process. Accordingly, the same claimed physical properties and effects would intrinsically be achieved by the practice of the combined method.

Response to Arguments

Applicant's arguments filed April 28, 2008 regarding the rejection of Miller in view of Morgenstern have been fully considered and they are persuasive. Namely, the examiner submits there is no motivation or reason to employ the calcium carbonate nucleating agent of Morgenstern in the method of Miller.

Applicant's other arguments filed April 28, 2008 have been fully considered, but they are not persuasive.

Applicant argues that Grinshpun et al. make hollow foam tubes not a foam board as claimed. This argument is not persuasive. Grinshpun et al. do employ hollow foam

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strands/tubes in the production of their structure. However, these strands are extruded and coalesced together to form a final structure. Grinshpun teaches the coalesced strands may take the form of a "foam sheet" that has a "rectangular structure" and that the foam sheet may have a width of 48-inches and a length of 4 to 16 feet. Further, in discussing the length, Grinshpun refers to the "board" length (page 11, lines 10-40). As such, the examiner submits that the rectangular foam sheet of Grinshpun is a foam board in accord with the plain meaning of the term. Applicant's argument in the first paragraph of page 8 appears to be comparing the board product of Grinshpun which contains hollow strands to "a solid foam board" of the "presently claimed invention". However, the examiner notes that the instant claims do not require that the board be a "solid" foam board. As such, the argument regarding "solid" is not commensurate in scope with the claims. Further, it is unclear to the examiner that the original disclosure has support for a limitation directed to a "solid" foam board.

Applicant argues that Morgenstern teaches away from the use of a nano-particle having a particle size in one dimension of less than 100 angstroms. Applicant argues that the preferred range disclosed by Morgenstern is 0.01 to 1 μm (100 angstroms – 1 μm) and as such Morgenstern teaches away from using a nano-particle having a particle size of less than 100 angstroms. This argument is not persuasive. As acknowledged in the REMARKS, Morgenstern discloses a broader range of suitable particle sizes ranging from 0.005 to 10 μm (50 angstroms - 10 μm). As such, Morgenstern discloses a range that overlaps with the claimed range. The examiner submits that the teaching of a reference is not limited to the "preferred" range, but is good for all that it teaches. Further, the examiner notes that the lower end of the "preferred" range of Morgenstern includes a particle size of 100 angstroms. The examiner submits that at the upper end of the claimed range "less than 100 angstroms" one skilled in the art would have

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expected the calcium carbonate to have the same properties as at the lower end of the "preferred" range of Morgenstern. See MPEP 2144.05 I.

Applicant argues that there is no motivation to utilize a nano-particle having a particle size in at least one dimension of less than 100 angstroms since the range of Morgenstern, with minimal exception, is outside of the applicable range. This argument is not persuasive. As set forth in the previous paragraph, the examiner submits the required particle size is disclosed by Morgenstern. Further, Morgenstern refers to these nucleating agents as being "conventionally used for foaming thermoplastics" (col. 2, lines 37-42) and refers to calcium carbonate as being a "suitable" nucleating agent (col. 2, lines 58). As such, the examiner submits that one having ordinary skill would have been motivated to employ "suitable" (MPEP 2144.06-2144.07) and "conventional" nucleating agents in the foaming method of Grinshpun, which specifically mentions calcium carbonate as a nucleating agent (page 19, lines 38-42).

Applicant argues that the 2 nm calcium carbonate disclosed by Nelson is employed to make the nanocomposite itself and that Nelson is silent with regard to adding the nanocomposite to a foam. This argument is not persuasive. The examiner understands the first portion of the argument directed to Nelson to suggest that the nanocomposite comprising the 2 nm calcium carbonate does not have a dimension within the claimed range since it is now formulated with a polymeric resin and would have a larger particle size once formulated. This argument is not persuasive. As set forth in the original disclosure, US 2005/0112356, paragraph [0011], nanoparticles bonded or combined with other materials to form compounds are within the intended scope. As long as the nanoparticle that is part of the nanoparticle compound is within the claimed size range, the size limitation is met. Further, applicant argues that Nelson does not state the additive is a foam additive. This argument is not persuasive. Nelson et al. teach that additives that are to be employed in polymeric extrusion processes,

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including calcium carbonate, are more readily blended with the polymer and provide superior mechanical and thermal properties by modifying them to form the nanocomposite set forth by Nelson et al. prior to employing them (Abstract; paragraphs [0004, 0019, 0020, 0038-0043]). As Grinshpun specifically disclose employment of calcium carbonate as a filler and as a nucleating agent and Nelson et al. teach employing their nanocomposite additives, which include calcium carbonate nano-particles, to yield improved properties in finally extruded products, the examiner submits the combination suggests employment of Nelson et al.'s additive in the process of Grinshpun. The motivation to do so is provided by Nelson et al. (i.e. better blending of the additive, improved mechanical and thermal properties). Applicant's arguments in view of the rejections based on Miller in view of Nelson are substantially similar to the arguments against the rejection of Grinshpun in view of Nelson. The arguments are not persuasive. Nelson teaches the nanocomposites form additives/fillers that improve the mechanical and thermal properties of extruded articles. Since Miller et al. disclose fillers may be employed to achieve desired properties in their extruded foam the examiner maintains one having ordinary skill would have been motivated to employ the additives/fillers of Nelson in the method of Miller et al., for the purpose of achieving improved mechanical and thermal properties in the foam of Miller. Additionally, Nelson et al. state their nanocomposites may be formulated as foams (paragraph [0056]).

Applicant argues that Chen et al. teach away from a nano-particle having a particle size of less than 100 angstroms since the lower limit of the range disclosed by Chen et al. is 100 angstroms and as such the ranges do not overlap. This argument is not persuasive. The examiner submits that at the upper end of the claimed range "less than 100 angstroms" one skilled in the art would have expected the calcium carbonate to have the same properties as at the lower end of the range disclosed by Chen et al., absent a showing otherwise. See MPEP

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2144.05 I. Further, the examiner notes that Chen et al. disclose that the minor axis particle size of the calcium carbonate fiber can be as low as 1 nm which is within the claimed range (paragraph [0049]). As such, the examiner maintains that a *prima facie* case has been set forth.

Applicant argues that Tan is silent as to the size of the calcium carbonate powder. This argument is not persuasive. The examiner submits that calcium carbonate is also set forth as a filler/reinforcing agent in Tan (col. 4, lines 63-col. 5, lines 18; col. 8, lines 25-30) in addition to the ceramic, metal, and carbon fiber material referenced in the REMARKS (col. 3, lines 64-67). The examiner notes the reinforcing elements are not limited to those set forth at col. 3, lines 64-67, but also include those set forth at col. 4, lines 63-col. 5, line 18. The examiner notes that Tan suggests the fillers are important in achieving the excellent mechanical properties in the foam (i.e. the fillers are reinforcing elements) and that these members are preferably "nano size" (col. 8, lines 25-34). Further, Tan notes that in order to be classified as nanocomposites the reinforcing material should be nano-sized (col. 8, lines 25-34) and further claims a "nanocomposite" foam comprising "a filler selected from the group consisting of...calcium carbonate" (claim 1). As such, the examiner submits Tan suggests the calcium carbonate reinforcing filler be nano-sized to form a nanocomposite foam with improved properties.

Applicant argues, with regard to claim 21, that Chen et al. teach away from a particle size of less than 100 angstroms since the lower limit of the range disclosed by Chen et al. is 100 angstroms and as such the ranges do not overlap. This argument is similar to the argument set forth above. However, the argument also states that the claimed property, namely, a cell orientation of at least about 1.2 is only achieved with a particle size less than 100 angstroms. This argument is not persuasive. The examiner submits that at the upper end of the claimed range "less than 100 angstroms" one skilled in the art would have expected the calcium carbonate needles to have the same properties as at the lower end of the range disclosed by

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Chen et al., absent a showing otherwise. See MPEP 2144.05 I. Further, with regard to the claimed property, the examiner submits that attorney arguments can not take the place of evidence in the record. The examiner submits there is no evidence in the record to suggest that a cell orientation of at least about 1.2 would not be achieved by using a particle with a cell size as low as 100 angstroms instead of using a particle with a cell size of less than 100 angstroms. Finally, the examiner notes that Chen et al. disclose that the minor axis particle size of the calcium carbonate fiber can be as low as 1 nm (paragraph [0049]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY WOLLSCHLAGER whose telephone number is (571)272-8937. The examiner can normally be reached on Monday - Thursday 6:45 - 4:15, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Jeff Wollschlager/
Examiner, Art Unit 1791

June 11, 2008